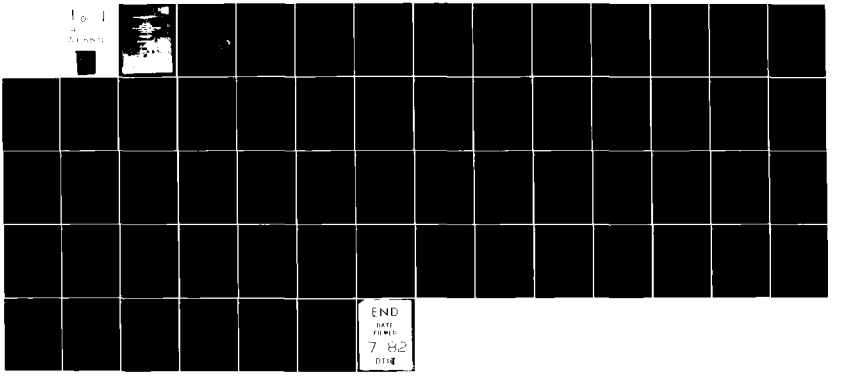
AD-A115 571 OHIO STATE UNIV COLUMBUS DEPT OF PSYCHOLOGY F/G 5/10
THE ROLE OF PERSONS AS ORGANIZING CATEGORIES IN SOCIAL COGNITIO--ETC(U)
JAN 82 J B PRYOR, M MITCHELL, L TYNER N00014-79-C-0027
UNCLASSIFIED SOCIAL PSYCHOLOGY BULL-82 NL



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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER TR/ONR-5	2. GOVT ACCESSION NO. AD-A115 571	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) The role of persons as organizing categories in social cognition.		5. TYPE OF REPORT & PERIOD COVERED Technical Report
		6. PERFORMING ORG. REPORT NUMBER 762498/713444
7. AUTHOR(s) Pryor, J. B., Ostrom, T. M., Herstein, J. A., Dukerich, J. M., Mitchell, M., & Tyner, L.		8. CONTRACT OR GRANT NUMBER(s) N00014-79-C-0027 and N00014-81-K-0112
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Psychology Ohio State University Columbus, Ohio 43210		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR 170-882 and NR 170-927
11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Programs Office of Naval Research (Code 452) Arlington, VA 22217		12. REPORT DATE January 15, 1982 13. NUMBER OF PAGES 43
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Person perception, person organization, social information, familiarity, encoding categories, sorting speed, discriminability		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Five studies investigated the factors that cause persons to emerge as organizing categories during the initial classification of social information about individuals in groups. Pre-integration categorization processes were studied using a speeded classification procedure. The collective evidence established that person discriminability and strength of the person-descriptor association are important determinents of the categorization process. These findings emerged for both generic knowledge structures and newly developed person categories.		

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The Role of Persons as Organizing Categories in Social Cognition

As we move through our day, we are continually encountering and cognitively categorizing events in our social world. Our social experiences provide us with a number of items of information about each of a number of persons, and these items often occur in a rather haphazard sequence. Nature rarely organizes our world for us; we must develop and make effective use of categories so as to bring coherence to the temporally shifting stimulus world.

It has long been assumed (e.g., Asch, 1952) that social information is classified on a person-by-person basis. That is, a separate category exists for each person in our social world, and each item of social information is placed in the appropriate person category. Despite this prevalent assumption, little is known about the role of persons in categorizing social information. Most past research on social categorization (e.g., Cantor & Mischel, 1979; Jeffery & Mischel, 1979; Hoffman, Mischel, & Mazze, 1981) has neglected the role of persons as categories in favor of examining how people 1) use trait, situation, and goal categories to structure information items about a single, perceptually isolated person, or 2) classify a large number of persons into subgroups.

Recent research on the organization of social information (Pryor & Ostrom, 1981) has suggested persons do function as categories in social cognition. Their findings indicated that social information concerning familiar persons is likely to be categorized, processed in memory, and subsequently retrieved in terms of person units.

Information concerning unfamiliar person showed much less person-by-person organization. Several studies on the retrieval phase (Ostrom, Pryor, & Simpson, 1981; Pryor, Simpson, Mitchell, Ostrom, & Lydon, Note 1) have found that information concerning unfamiliar persons is often organized according to its descriptive and temporal features.

The purpose of the present series of studies is to explore the categorization process as it pertains to person information. What are the qualities that cause persons to emerge as important organizing categories? Pryor and Ostrom (1981) found that the ease or speed with which subjects can categorize information according to persons was affected by their prior familiarity with the persons. A first step in understanding this process then, is to dissect this variable of person familiarity.

Pryor and Ostrom (1981) viewed person familiarity as a compound construct composed of at least three conceptually independent components. (1) Discriminability. Familiar persons are likely to be highly discriminable as organizing categories. We are likely to know unique information about familiar persons, things we do not know about other people. Thus, the mental representation of a familiar person shares some of the properties of what Rosch (Rosch, 1973; Rosch, Mervic, Gray, Johnson, & Boyes-Braem, 1976) has termed a "natural category." That is, information about familiar persons does not overlap as much as does information about unfamiliar persons. (2) Inter-feature association. It seems likely many of the information items constituting the representation of a familiar person should "make sense," that is,

they may be associatively inter-related independent of their relationships to the person. For example, you may know a person who has large, rough hands, a good tan and is a farmer. These features would appear to go together even to people who were not personally familiar with your friend. (3) Nodal association. Anderson (Anderson & Hastie, 1974; Anderson, 1977) has suggested that specific nodes are set up in memory to represent individuals. These nodes are associatively connected to collections of features that pertain to the individual. The node itself may be thought of as some distinguishing feature (like a name) or as an abstract nexus of associative connections.

These three concepts may be considered different potential components of familiarity as it pertains to persons. Some recent research (Ostrom, Pryor & Simpson, 1981; Pryor, Simpson, Ostrom, Dukerich and Jost, Note 2) reports evidence that at least two of these components, discriminability and inter-feature association, influence the organization of social information in free recall. The present series of studies focuses on a different aspect of information processing: the speed or ease with which people categorize social information. Although all three components may ultimately contribute in one way or another to the organization of social information, different components may be important in the categorization phase than were obtained in the retrieval (i.e., free recall) phase.

Categorization speed has received little research attention in person perception. Most work has been addressed questions such as the hierarchical structure of categories, the examination of

prototypicality and integration processing induced by memory and impression sets (Cantor & Mischel, 1979; Jeffery & Mischel, 1979; Hoffman, Mischel, & Mazze, 1981). Despite this lack of attention, categorization speed is important to the study of social categories. In their review of the functions of schemas, Taylor and Crocker (1981) note that "What schemas do is to enable the perceiver to identify stimuli quickly . . . "(p. 93). This presumably refers to a preintegration activity in which the person merely places an incoming item of information into the appropriate category. This act precedes any cognitive operations on the information that may occur as a result of the categorization. Categorization speed, then, refers to the time it takes to designate the appropriate category (in our case, a person) for each new item of information. The estimate of speed should not involve the time required to relate the new information item to existing items in the category for purposes, for example, of reaching a decision or forming an impression.

The categorization task used by Pryor and Ostrom (1981) was designed to assess preintegration categorization speed. Their methodology was also adopted in four of the five studies reported in this paper. Subjects were asked to sort index cards containing social information (e.g., the person's name plus a fact about the person) according to person categories as quickly as possible. We view this task as a motoric analogue of the cognitive activity that takes place when people initially categorize information according to person units. As an item of social information is received, the perceiver cognitively

places it in a memory location where other items about the same person are stored. The speeded classification task parallels this process directly. By comparing classification speeds across conditions which vary the content of the social information, we can determine the immediately perceivable factors that facilitate categorizing information by persons.

Experiment 1

Pryor and Ostrom (1981) found that decks of 3 x 5 cards containing items of social information were sorted faster when they were about familiar persons than about unfamiliar persons. But in that research, all three components of familiarity were deliberately confounded to produce a maximally forceful manipulation of familiarity. Experiment one was designed to determine which of the three components contribute to the categorization phase.

Table 1 shows one of the original stimulus ensembles used in

Insert Table 1 about here

Pryor and Ostrom (1981) (upper left panel). The Familiar Name/High Association condition represents an original ensemble of familiar facts about familiar persons. It can be contrasted with the Unfamiliar Name/Low Association condition (lower right panel) that was used by Pryor and Ostrom (1981) in their unfamiliar condition.

Four separate stimulus ensembles like this one were created from normative information generated by 38 Ohio State University students. The students were asked to generate the names of three well-known

persons and to give three well-known facts about each person. Four sets of five of the most frequently mentioned person were selected. Five of the most frequently mentioned facts about each person were converted to general descriptors which did not uniquely distinguish the familiar persons. These four stimulus ensembles were again used in the present experiment. (Each twenty-five item ensemble could also be expressed in a shortened, nine item version like the one in Table 1.)

Pryor and Ostrom's (1981) manipulation of familiarity intentionally confounded two aspects of their stimulus ensembles, Name Familiarity and the Association Value of the descriptors. Not only are the names familiar in the upper left hand panel of Table 1, but the three descriptors for each person show a high level of inter item association. It makes sense that the genius is a shy scientist (see the descriptors for A. Einstein). The unfamiliar versions of the stimulus ensembles were created by substituting unfamiliar names for the familiar ones and shuffling the descriptor configurations orthogonally to reduce inter-feature associative cohesiveness. It is somewhat unexpected to find that the leader is a shy philosopher (see the descriptors for H. Turnbull). Thus, the original Pryor and Ostrom experiment used only the Familiar Names/High Association Value and Unfamiliar Names/Low Association Value conditions shown in Table 1.

The present experiment added the other two conditions depicted in Table 1, thereby unconfounding the three components of familiarity. Orthogonal manipulation of Name Familiarity and Descriptor Association

allows for testing the relative contribution of the three conceptual components described above to the ease with which subjects can categorize the information by persons. The influence of the discriminability component is linked to the manipulation of Names. The names define the uniqueness of the person categories. Therefore, a main effect for names such that subjects are able to classify information by persons more quickly under familiar name conditions would indicate the influence of discriminability. A main effect for Descriptor Association Value such that High Association sets are classified more quickly than Low Association sets would evidence the influence of inter-feature association. An interaction between these two variables such that the Familiar Names/High Association condition was classified more quickly than any of the other three conditions would result from the organizational influence of nodal association. This is because that is the only condition where strong bonds pre-existed between the names and the descriptors.

Method

Overview of the design. The design was a (2 x 2) x 2 x 4 x 4 factorial: Name Familiarity X Descriptor Association Value X Deck Size X Condition Counterbalancing Order X Stimulus Replication Counterbalancing Order. The first two were within-subjects factors and the latter three, between-subjects factors. The deck size factor varied the number of cards to be sorted. Decks contained either nine cards (3 sentences about each of 3 persons, as shown in Table 1) or 25 cards (5 sentences about each of 5 persons). All subjects received all four conditions represented in Table 1, each expressed with a

different stimulus ensemble.

Subjects. Thirty-three male and female undergraduate and graduate students from Ohio State University were paid three dollars for their participation in the experiment. They were recruited by an advertisement in the university paper requesting paid participation, with the stipulation that their nature language be English. One subject's data was excluded from the study because he had difficulty understanding the task. One subject was randomly assigned to each of the 32 conditions created by the between-subjects variables.

Procedure. Subjects were told that the purpose of the experiment was to determine how quickly they could perform two tasks simultaneously. One task was to classify decks of index cards into pre-designated categories defined by the persons' names appearing on the cards. This involved sorting the cards into separate piles. The other task was to simultaneously scan each card for possible spelling errors. This error scan was intended to insure that subjects completely read each card. The decks were shuffled before they were given to the subject.

Subjects were given each deck face down and began classifying when the experimenter initiated a timer and said "Go." A customized Intersil timer (Model No. ICM7226AlDL) was used to measure classification time in milli-seconds. The subjects stopped the timer after they finished classifying the deck by pressing either a "Yes" or "No" button. "Yes" indicated that the subjects had detected a spelling error and "No," that they had not. Subjects classified each deck only once. The experimenter manually recorded the subjects' classification time and answer after each sort. Speed and accuracy were both emphasized to subject as goals in their performance.

Four practice decks were given to the subject prior to the experimental decks. The practice decks contained four cards for each of four people; half of each deck pertained to familiar persons and the other half to unfamiliar persons. Spelling errors were present in each of the practice decks. No errors were contained in the experimental decks. However, a bogus deck, similar to the practice decks was presented midway through the experimental decks. This deck contained an error.

Upon completion of the last classification trial, subjects were debriefed as to the nature of the experiment and asked not to discuss it with other potential subjects.

Results

Classification time. *Classification times* were divided by the number of cards in the deck (9 or 25). The average classification time per card was analyzed in a (2 x 2) x 2 x 4 mixed design analysis of variance (Poor, 1973). This analysis collapsed across the Condition Order Counterbalancing variable and included all other variables in the design. The means for the four Names Familiarity by Descriptors Association conditions are presented in Figure 1. Subjects classified the information ensembles according to persons more quickly when the names were familiar than when they were unfamiliar, $F(1,24) = 32.40$, $p < .001$. Since this difference occurred under both conditions of Descriptor Association Value, it indicates that the discriminability component of familiarity was one contributor to the overall familiarity effect obtained by Pryor and Ostrom (1981).

Insert Figure 1 about here

A marginally significant main effect was found due to the Descriptor Association variable, $F(1,24) = 3.29$, $p < .10$. However, the pattern of means suggests that this main effect was principally due to the interaction between these two variables, $F(1,24) = 4.48$, $p < .05$. Simple effect comparisons showed that High and Low Association decks were sorted at about the same speed under Unfamiliar Name conditions, $F < 1$, but under Familiar Name conditions High Association decks showed faster classification times than Low Association decks, $F(1,24) = 3.75$, $p < .07$. Since Association Value only made a difference for the Familiar Name decks, the nodal association component of familiarity was supported and the inter-feature association component was not supported. This is because the inter-feature association component predicts that high (vs low) association value should facilitate sorting an equal amount in the two Name Familiarity conditions. Nodal association, on the other hand, predicts this facilitation should only occur in the Familiar Name condition.

Half of the subjects sorted 9 card decks and half sorted 25 card decks. This variation was included to insure generality over decks of different sizes; this is the counterpart of classifying information from three person groups vs. five person groups. Deck size was not found to interact with overall person familiarity in the Pryor and Ostrom (1981) study. No significant zero order

interaction was observed between Deck Size and Name ($F(1,24) = 2.18$, $p > .10$), indicating that the discriminability component of familiarity was present for both deck sizes. Similarly, no significant interaction emerged between Deck Size and the Name by Association Value interaction ($F(1,24) = 1.92$, $p > .10$). This implies that the nodal association component of familiarity contributed equally for both deck sizes.

There was a slight tendency for sorting times to be longer for the 25 card decks ($\bar{X} = 2194$) than for the 9 card decks ($\bar{X} = 1992$), $F(1,24) = 2.14$, $p > .10$. This tendency was significantly greater for the high association value decks than for the low association value decks, $F(1,24) = 5.23$, $p < .05$. This may be attributable to alpha error since Pryor and Ostrom (1981) found no significant deck size effects and since no theoretically relevant interpretation was apparent. The only other significant effects were a main effect for Stimulus Replication Order, $F(3,24) = 3.58$, $p < .05$, and a Name X Deck Size X Replication Order interaction, $F(3,24) = 3.57$, $p < .05$. The replication order main effect showed simply that some orders results in faster classification than others. The interaction was somewhat complex; the main effect for Name Familiarity was stronger for some combinations of Set Size and Replication Order than for others.

Errors. As a check on whether subjects actually read all of the information on each card the experimenter noted subjects' accuracy in detecting spelling errors. Two types of detection mistakes were possible: false negatives (subjects failed to notice spelling errors

in the five practice and bogus decks) and false positives (subjects reported errors in the four experimental decks where there were none). Nine percent of the subjects' responses to decks with actual spelling errors were false negatives, 12% of the subjects' responses of error-less decks were false positives. No differences were detected across experimental conditions. These accuracy levels were comparable to those obtained by Pryor and Ostrom (1981).

Discussion

Our intention in designing the speeded categorization task was to create a motoric analog of the more spontaneous categorization activity. Subjects literally placed items of person information into person catergories. The task was designed to minimize any tendency to integrate the items, once categorized, with other items for purposes of subsequent result or judgement. It could be argued, however, that this task could be performed by our subjects without their paying any attention to the descriptors. Since sorting was by name only, subjects need only to have attended to the name. If this were true it would be a seriously limitation on our use of this methodology, since two of the three components of familiarity (nodal association and association value of the descriptor set) require that attention be paid to both the name and the descriptor.

Two aspects of our data lead us to believe that subjects seriously attended to the descriptor information prior to classifying each card. Task instructions required subjects to look for spelling errors. Our subjects were highly accurate in this task which

indicates that they attended (at least minimally) to the descriptors on each card. Second, the classification speed findings established that the nodal association component of familiarity was contributing to the results. This could not have occurred if subjects did not form a bond between the name and descriptor prior to categorizing the card.

These results showed support for the discriminability and nodal association components of familiarity. They do not evidence the influence of interfeature association. This is reasonable given that the speeded classification methodology was designed to study those information variables that are immediately apparent to the observer at the moment of categorization. The immediate salience of the discriminability and nodal association components of familiar person categories would suggest that these components are important to the categorization process in a variety of situations.

The absence of support for the interfeature association component of familarity is informative about the nature of the cognitive activity that occurs at the time of categorization. Upon receiving an item of person information, the observer is automatically aware of who the person is (thereby involving category descriminability) and which person is being described (thereby involving nodal association). However, because we are studying preintegration categorization, our experimental task did not involve any direct comparisons between any two descriptors for a single stimulus person. Subjects respond to each descriptor sequentially as it was encountered. This means that the task offered no direct invitation to utilize the

interfeature association component of familiarity. For interfeature association to influence categorization speed, our subjects would need to spontaneously access the previously categorized items at the time of category selection. The absence of an Association Value effect with unfamiliar names suggests that categorizing items of social information by person does not involve a comparison of the new descriptor with previously categorized descriptors.

Experiment 2

In this experiment, we deviated from the speed classification methodology to examine the idea that interfeature association may become more important in the categorization of person information when subjects are actively creating categorical structures without rigid temporal constraints. We took the four stimulus ensembles used in the last experiment (the complete 25 item versions) and deleted the names. We asked our subjects to create persons by putting these descriptors together into piles that "seemed to go together." Under these conditions subjects are directly invited to make interfeature comparisons. We hypothesized that the resulting groupings would tend to reflect the descriptor configurations corresponding to familiar persons (i.e., the high association value grouping in Table 1).

Method

Subjects. Twelve undergraduates enrolled in Introductory Psychology classes at Ohio State University participated as subjects in this experiment. Participation was partial fulfillment of a course requirement. Subjects were randomly assigned to the four Latin Square presentation orders used to counterbalance the design.

Procedure. Subjects were given four sets of twenty-five descriptors. These descriptors consisted of the same stimuli used in Experiment 1 minus the names. Each descriptor was typed on a 3" X 5" index card. Subjects were instructed to sort each set of descriptors into five piles of five cards each. Each pile was to represent an imaginary person. The only stipulation placed on the sorting was that the descriptors within a pile should appear "to go together" from the subject's perspective. Subjects were allowed as much time to sort as they desired. The order of presenting the four stimulus decks was counterbalanced across subjects. Following the last sorting trial, subjects were asked if they recognized any actual persons described with the stimulus replications. Any correct guesses were noted by the experimenter.

Dependent measure. For each stimulus replication a 25 X 25 covariation matrix was constructed. This matrix represented all possible pairs of descriptors from the stimulus replication. Within this matrix the subjects' unique pairing of descriptors within their own generated descriptions were represented. Subjects were given a +1 on a "familiar index" each time one of their generated pairings corresponded to a descriptor pairing from one of the High Association Value descriptor configurations from Experiment 1. Similarly, subjects were given a +1 on an "unfamiliar index" each time one of their generated pairings corresponded to one of the Low Association Value descriptor configurations from Experiment 1. Using these indices it was possible to assess the extent to which subjects' generated configurations of descriptors resembled the configurations of either the

High or Low Association conditions. The values on these indices ranged from 0 to 50. A score of 50 on either index would indicate that a subject's generated descriptor configuration corresponded exactly to the respective stimulus configuration (either High or Low Association). A score of 0 would indicate no correspondence. A somewhat similar methodology was employed by Hoffman et al, 1981 to study the organizational influence of processing objectives in single person information ensembles.

Results and Discussion

The familiar and unfamiliar covariation indices were treated as repeated measures in a (2 X 4) X 4 mixed design analysis of variance (Covariation Index X Stimulus Replication X Latin Square Counter-balancing Condition). This analysis revealed that subjects' generated person descriptions tended to resemble the familiar descriptor configurations ($\overline{X}_F$ = 13.94) more than the unfamiliar configurations ($\overline{X}_U$ = 6.67). This main effect was satisfyingly significant; F (1,8) = 241.67, $p < .001$. The analysis also showed a main effect for stimulus replications; F (3,36) = 15.23, $p < .01$. Averaging across the two indices, higher mean covariation scores were detected for some stimulus replications than others.

On the whole, subjects offered few guesses about the possible identities of the stimulus persons. On the average, subjects mentioned 1.42 names of familiar persons that came to mind while they were sorting the descriptors. Of these, 47% were the names of stimulus persons actually represented in the ensembles. The most frequently mentioned correct name was "John F. Kennedy," constituting 29% of the names mentioned. Kennedy's descriptors were: Irish, killed, Catholic, leader and democrat. It seems likely that recognition of Kennedy could be the result of the strong semantic associations

between certain descriptors (e.g., Irish Catholic) presented in the context of an overall description which was, perhaps, more individuating than the others.

These results support the idea that inter-feature association is important when subjects are actively engaged in the process of creating person categories. One may speculate that the effort observers expend in arriving as such internally consistent categorizations may vary highly across different social situations. Therefore, the extent to which inter-item association is important may also vary. Although not tested in this study, the influence of discriminability and nodal association would appear to be relatively unaffected by such variations.

Overview of Experiments 3, 4 & 5

In the next three experiments we returned again to our speeded classification methodology to continue our study of pre-integration categorization processes. Experiment one focused on the differences between unfamiliar persons and persons about whom subjects had received information on a number of previous occasions. Both discriminability and nodal association were shown to contribute to those differences. But if these two components of familiarity are fundamental to the categorization process, they should also be influential in the development of person categories for newly encountered stimulus persons (e.g., new group members). That is, categorization speed should be facilitated to the extent that the newly developed person categories are highly discriminable and that the nodal associations are strong. Experiment three provides a test of this prediction

regarding the emergence of person categories.

Certain items of information about newly encountered group members may evoke pre-existing stereotypes. Information about a person's race, religion, or sex has this potential. This suggests that such information may play a special role in the categorization process. Although a great deal of work has been done on the effects of stereotypes on post-integration responses such as memory, impressions, and judgment (Hamilton, 1981), the issue of categorization speed has been ignored. Experiments four and five show that under certain conditions, stereotype information can substantially facilitate the categorization process.

Experiment 3

In this experiment we began with a set of stimulus persons who were all hypothetical and thus, by definition, unfamiliar. Through a variation in subjects' initial (i.e., pre-categorization) exposure to the stimulus persons we created two conditions: 1) an Individuated condition and 2) a Non-Individuated condition. In the Individuated condition the persons were described with non-overlapping descriptors and each descriptor was paired with the relevant person on several occasions. In the Non-Individuated conditions, the descriptor configurations completely overlapped across persons and each person/descriptor pairing was presented only once. Descriptor overlap relates to the discriminability component and pairing frequency relates to the nodal association component. In many ways these two conditions are conceptually analogous to the Familiar Name/High

Association condition and the Unfamiliar Name/Low Association condition in Experiment 1. Our aim was to create differential knowledge structures using the two components verified in Experiment 1 and observe their influence on categorization. We chose to combine both discriminability and nodal association in this manipulation since the two are normally intertwined when people encounter a set of new acquaintances.

We had a second major concern in preparing the materials for this study. In Experiment 1, the familiar names possibly differed from the unfamiliar names in ways other than just discriminability. That is, more frequent past exposure to the familiar names (as compared to the unfamiliar names) could have led to different affective reactions (through mere exposure effects and direct informational influence, for example) and differences in self relevance. Also, phoneme recognition may be faster for familiar than for unfamiliar names. Such differences were controlled in this study through insuring that subjects in both experimental conditions were exposed equally often to each person name and to each descriptor.

Method

Subjects. Twenty-four male and female undergraduate students from Ohio State University participated in the experiment as partial fulfillment of an Introductory Psychology course requirement. Subjects were randomly assigned to the various between-subjects conditions created by the counterbalancing variables.

Design and Procedure. The design was (2) x 2 x 4 mixed factorial design. The within-subject variable was the Individuation factor and the two between-subjects variables were Condition Counterbalancing Order and Replication Counterbalancing Order, respectively. Four stimulus replications were generated, each of which could be presented in either an Individuated or a Non-Individuated manner. Each subject received two versions of each condition, each conveyed with a different stimulus replication. The order of the four stimulus replications was counterbalanced using a Latin Square design. Condition order was counterbalanced with an ABBA design.

Each stimulus replication consisted of sixteen different descriptors and four names (first plus last names). The sixteen descriptors were drawn from a pool consisting of 16 different categories of information with eight instances in each category. The categories were home town, religion, father's occupation, illnesses, and anti-social behavior, club membership, favorite sport, college major, grade point average, positive trait, negative trait, favorite activity, part time job, favorite music group, favorite beverage, and favorite TV show. Sixteen descriptors were randomly selected for each replication, one from each category within each replication, and four were randomly assigned to each of the four stimulus persons. Female names were used in two of the replications and male names were used in the other two.

The basic procedure consisted of two phases: An exposure phase and a classification phase. The Individuation manipulation was accomplished during the exposure phase. In the Individuated Condition, subjects read aloud 64 sentences from index cards. These sentences

represented the person/descriptor pairings (e.g., John Lang is Catholic). Each of the four stimulus persons was paired with four unique descriptors. Each person/descriptor pairing was repeated four times. Each deck of 64 cards was shuffled separately for each subject. In the Non-Individuated conditions, subjects read 64 sentences as above only each of the 16 descriptors was paired once with each of the four names. Thus, while there was no overlap in the name/descriptor pairings in the Individuated condition, there was total overlap in the Non-Individuated Condition. Also, the frequency with which a descriptor was associated with a particular name was four occasions in the Individuated condition and only one occasion in the Non-Individuated condition.

The procedure during the classificaiton phase was quite similar to that of Experiment 1. Following the exposure phase, subjects were given a 16 card subset of the exposure deck that contained four descriptors about each of the four persons. The decks were shuffled separately for each subject. They classified them according to person piles as quickly as possible while scanning for spelling errors. These 16 cards represented the unique person/descriptor pairings from the Individuated conditions. Thus, across the different counterbalancing conditions, subjects sorted the same four 16-item decks. What varied was whether the classification deck was preceded by an Individuated or Non-Individuated exposure phase. Classification times were recorded using the same procedure as before.

Results and Discussion

Spelling errors. As in Experiment 1, we examined subjects' accuracy in detecting spelling errors as a check on whether they

read the entirety of each card. The false negative error rate was 6%; the false positive error rate was also 6%. No differences were detected between experimental conditions.

Classification time. The average per card classification times were analyzed in a (2) x 2 x 4 mixed design analysis of variance, the factors being Individuation, Condition Counterbalancing and Replication Counterbalancing, respectively. The main effect for Individuation condition was statistically significant, F (1, 16) = 5.43, $p < .04$. Subjects took less time to classify the social information according to persons in the Individuated Conditions ($\bar{X}$ = 2850 milliseconds) than in the Non-Individuated conditions ($\bar{X}$ = 2933 milliseconds). Individuation did not significantly interact with Condition Counterbalancing (F (1,16) = 2.55, $p > .10$) or with Replication Counterbalancing (F (3.16) = .55, $p > .10$), thereby establishing its generality over the different stimulus sets and order replications.

Thus, differences in the exposure to new groups of persons that incorporate both discriminability and nodal association produced classification time differences imilar to those found in our familiarity studies. The high and low Individuation conditions employed here are conceptually analogous to the Familiar Names/High Association Value and Unfamiliar Names/Low Association Value Conditions found in Pryor and Ostrom's (1981) study and replicated here in Experiment 1. These findings strengthen our analysis of the contribution of the discriminability and nodal association components to person categorization.

Experiment 4

In the next two studies, we attempted to demonstrate that discriminability by itself, independent of the frequency of specific nodal associations, can influence the ease with which subjects can categorize information by persons. While the concept of nodal association necessarily implies something about prior experience, the discriminability of persons as organizing categories may vary directly as a function of immediately evident interpersonal information. Therefore, discriminability would appear to be particularly important in the development of person schemata. Above we argued that familiar persons are likely to be those about whom we know unique information. However, the uniqueness of information may be considered a relative concept. Within any group situation the degree of overlap of obvious personal characteristics can render the group members more or less discriminable as individuals. In some situations group members may share few common characteristics and thus be highly discriminable as organizing categories, while in other social groupings members may share many common characteristics and thus not be discriminable as organizing categories. The correlational structure (Garner, 1974) of salient personal characteristics within a social situation may influence the use of persons as organizing categories.

In the next experiment, we varied the extent of inter-person overlap across three dimensions (race, sex, and personality) within a group of four persons. Verbal labels were used in defining these dimensions. Variations in the within group structure of these

dimensions created two conditions: a High Discriminability condition and a Low Discriminability condition. We predicted that subjects would be able to categorize information according to persons more quickly in the High Discriminability Conditions than in the Low Discriminability Conditions.

Method

Subjects. Subjects were 32 undergraduates from Ohio State University. They were recruited through advertisements in the student newspaper and paid $3.00 for participation. The subjects were randomly assigned to the various between subject conditions created by the counterbalancing variables.

Stimulus Materials. Three stimulus matrices were created. It was possible to generate four High Discriminability groups of persons and four Low Discriminability groups of persons from each matrix. Two of these stimulus matrices served as Experimental matrices and the other served to generate practice and bogus decks. Each matrix consisted of sixteen persons. Each person within each matrix was described by three focal characteristics plus four descriptor phrases. The focal characteristics were used by subjects in the speeded classification task; hence, these were used in manipulating discriminability. Table 2 shows one matrix, with each call containing the three focal characteristics. The four columns represent four

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Insert Table 2 about here

---

groups of High Discriminability stimulus persons. Thus, Low Discriminable groups consisted of four stimulus persons who were all of the same race and sex, and who possessed similar personality traits. High Discriminable groups contained one person from each of the four possible race-sex combinations and who possessed different personality traits.

The focal characteristics of each person were printed on the upper lefthand corners of four index cards. Below and to the right of the focal characteristics was the descriptor phrase (e.g., "plays the piano"). These descriptors were taken from the same 16 categories used in Experiment 3. The descriptor phrases were assigned to the 16 persons in the following manner. Across the top row of each stimulus matrix, one descriptor from each of four different categories was randomly assigned to each person. Different descriptors from these same four category-quarters were assigned to the remaining rows of stimulus persons using a latin square design. This resulted in a balanced representation of all 16 categories within each row and column of the matrix.

Experimental design. The experimental design was a 2 (Replication Order) x 8 (Condition Order) x 2 (Session) x 2 (Discriminability) factorial. The first two factors were between-subjects factors and the latter two, within-subjects. Both experimental matrices were presented to subjects across two consecutive sessions. The order of these matrix replications was counterbalanced over sessions (1, 2 vs 2, 1). Within each session subjects received all four High

Discriminability groups and all four Low Discriminability groups from an experimental matrix. The presentation order of these conditions within a matrix replication was initially randomized and than an eight level Latin Square was used to generate seven other condition counterbalancing orders. This condition order counterbalancing procedure occurred in parallel across the two matrix replications, thus producing the eight conditions orders.

Procedure. The task given to subjects was the same here as in the two previous speeded classification studies. Subjects sorted index cards into person categories as quickly as possible while scanning for spelling errors. The decks were in a different shuffled order for each subject. Since no names were present on the cards, the focal characteristics at the upper left hand corner of each card served to define the persons. Subjects were told to view these focal characteristics as "verbal photographs." Only the descriptor phrases contained spelling errors. As before, subjects quickly classified each stimulus deck and then pressed a "Yes" or "No" button to indicate whether there had been spelling errors.

Subjects first sorted two practice decks containing spelling errors. These were derived from the bogus matrix. One was High Discriminability and the other was Low Discriminability. Both of these contained errors. The experimenter subsequently gave subjects feedback on their accuracy in detecting errors. He told them that no further feedback would be given and that some of the subsequent decks would contain errors while others would not. The subject then sorted

each of the 16 experimental decks plus six bogus decks. The bogus decks appeared on the 3rd, 6th, 9th, 12th, 16th, and 20th sorting trials. Half of these were High Discriminability and the other half, Low Discriminability. All bogus decks contained errors in the descriptor phrases. Following the final sort, subjects were debriefed as to the nature of the experiment and asked not to discuss it with other potential subjects.[1]

Results

Errors. In examining the detection of spelling errors, the false positive rate was 22% and the false negative rate was 10%. No differences were detected between experimental conditions.

Classification time. As before, the time it took to classify each deck was divided by the number of cards. These averages were analyzed in a 2 (Replication Order) x 8 (Condition Order) x 2 (Session) x 2 (Discriminability) x 4 (Trials) mixed design analysis of variance. The first two variables were between-subjects and the last three were within-subjects. Trials represented the relative order (1st through 4th) of the four stimulus decks for each condition (High or Low Discriminability) within a session. As hypothesized, there was a main effect for Discriminability, F (1, 16) = 20.85, $p < .01$. Subjects classified the High Discriminability ($\bar{X}$ = 2677 milleseconds) in less time than the Low Discriminability decks ($\bar{X}$ = 2952 milleseconds). The Discriminability effect generalized over Replication Order (interaction F (1,16) = .02) and Condition Order (interaction F (7,16) = .23). Although interactions were obtained between Discriminability

and the factors of Session (interaction F (1,16) = 3.50, $p < .10$) and Trials (interaction F (3,48) = 3.03, $p < .05$), they were ordinal in both cases and so do not qualify the direction of the Discriminability effect. In both cases, the size of the discriminability effect diminished with practice.

Significant main effects were observed for Sessions, F (1,16) = 24.17, $p < .01$, and Trials, F (3,48) = 10.14, $p < .01$. Both of these appeared to reflect the influence of practice; subjects classified more quickly over time.

Discussion

The results support the hypothesis that discriminable stimulus persons are easier to categorize as individual persons than are stimulus persons that are low in discriminability. Although race and sex stereotyping information was equally present in both conditions, its effect on the categorization process was dependent on the group context. The results are congruent with Garner's (1969) findings that discriminable stimuli are more easily categorized than are less discriminable stimuli. Thus, as Cohen (1969) and Pollack (1963) have found, discrimination time is affected by the ease and economy with which the input can be coded.

It is worth noting that subjects sorting low discrimination decks only needed to read the one focal word that pertained to the person's personality. The other two focal words were the *same* for each stimulus person. In the high discriminability decks, all three focal words helped differentiate between the group members. This suggests that subjects may have spent *less time* reading the focal information in the low (compared to the high) discriminability decks. Since this is opposite to the obtained result, it appears that simple reading time does not account for the obtained difference in classification time.

These results clearly demonstrate that the correlational structure of obvious interpersonal dimensions within a group influences the discriminability of the individual group members as organizing categories. These results seem quite congruent with Rosch's (Rosch et al., 1976) findings concerning the categorization of basic physical objects. Rosch's studies also found the degree of category overlap to be important in the perception of categorical structure. The present findings suggest that specific situational considerations are very important in determining the extent to which persons are perceived as individuals.

A possible limitation of this experiment involves the use of semantic labels for defining the focal characteristics. Race and gender are usually conveyed visually rather than verbally. One may

question whether the unitization of these characteristics into discrete verbal labels may have enhanced the observed classification differences. We decided to examine this possibility and to extend the generality of our findings in Experiment 5 by conceptually replicating Experiment 4 using photographs rather than verbal labels to activate race and gender stereotypes.

Experiment 5

Method

Stimulus Materials. Two 16-person stimulus matrices were created. The structure of these matrices was similar to that of the matrices in Experiment 4, only photographs instead of focal verbal characteristics were used to define the persons. The four columns of photographs in each matrix consisted of four black females, four white females, four black males and four white males. These photographs were selected from Makio 1978, the Ohio State University yearbook. In addition to the overlap of racial and gender characteristics within the matrical columns, the photographs in each column were selected to maximize the overlap of other obvious characteristics such as hair style, hair color, facial hair, eye glasses, etc.

Stimulus decks of photographs plus descriptors were created in the same manner as those used in Experiment 4. Each index card consisted of a photograph at the upper right hand corner and a descriptor phrase below and to the left. As before, each separate matrix could be used to generate 4 High and 4 Low Discriminability stimulus decks. Two replications were created. The first

replication consisted of the four High Discriminability stimulus decks from one matrix and the four Low Discriminability from the other. The second replication simply reversed the relationship of discriminability to the two matrices.

Subjects. Twenty-four Ohio State University Introductory Psychology students served as subjects. Participation was partial fulfillment of a course requirement. These subjects were randomly assigned to the between subjects conditions created by the counterbalancing variables.

Design and Procedure. The experiment employed a 2 (Replication) x 2 (Order) x 4 (Trials) x 2 (Discriminability) mixed factorial design. The first two were between-subjects variables, and the last two; within-subjects variables. Each replication consisted of eight experimental stimulus decks, four High Discriminable and four Low Discriminable. The presentation order of these decks was initially randomized within each replication with the constraint that if a High Discriminability Deck appeared on the first experimental trial then a Low Discriminability Deck would appear on the last and vice versa. Half of the subjects received this random order and the other half received the reverse. The Trials factor refers to the consecutive order (1st through 4th) in which the decks were sorted within each condition (High or Low Discriminability).

The instructions to the subjects were basically the same as in the previous speeded classification studies. Subjects received two initial practice decks and four bogus decks interspersed throughout

the experimental decks (on the 2nd, 4th, 6th and 9th sorting trials). These were all 16 item decks like the experimental decks. All of these contained errors in the descriptor phrases. One practice deck contained photographs of four Oriental females and the other, photographs of two white males and two white females. Two of the bogus decks mimicked the racial/gender composition of High Discriminability decks and the other two, that of Low Discriminability decks. Following the final sorting trial[2] subjects were debriefed as to the nature of the experiment and asked not to discuss it with their classmates.

Results

Errors.

As before, a check on subject detection of spelling errors indicated that subjects read each entire card. The false negative error rate was 15% and the false positive error rate was 7%. No differences were detected between experimental conditions.

Classification time.

The average per card classification times were analyzed in a 2 x 2 x 2 x 4 mixed design analysis of variance using all the factors in the experimental design. As hypothesized, there was a significant main effect for Discriminability, F (1,20) = 138.61, $p < .001$. Classification time was shorter for the High Discriminability conditions ($\bar{X}$ = 1931 milleseconds) than the Low Discriminability conditions ($\bar{X}$ = 2208 milleseconds). The linear component of the Trials main effect was also significant, F (1,20) = 8.58, $p < .01$. Subjects improved their classification times over replications of the same

condition. The average per card classification times for Trials 1 through 4 were 2106, 2094, 2073, and 2001 milleseconds, respectively.

Analyses revealed only two other significant effects: A Replication X Discriminability interaction, F (1,20) = 7.28, $p < .05$, and a Replication X Order X Trials (linear component) interaction, F (1,20) = 4.78, $p < .05$. Although the predicted Discriminability effect appeared under both replications, it was stronger for one than for the other. For the other interaction some Replication/Order combinations produced a stronger Trials effect than others.

Discussion

Overall, these results provide a useful replication of the major findings in Experiment 4. The structure or degree of overlap in visually obvious variables within a group of stimulus person influenced the ease with which our subjects could cognitively discriminate them as individuals.

Two major points are important with regard to these last two studies. First, these studies indicate that it is possible to operationalize the conceptual variable, discriminability, as it pertains to persons in ways that are independent of existing knowledge structures. This is important because variations of discriminability like those used in Experiment 1 cannot completely disentangle discriminability from other possible concomitant variables. While variations using existing knowledge structures may be logically related to the conceptual variable, discriminability, only in these laboratory

variations was the conceptual variable used to define the manipulations.

Second, these findings suggest that obvious interpersonal variables like race and gender may under many circumstances help an observer in cognitively differentiating persons as individuals. Previous social psychological research concerning the relationship of these variables to person perception has traditionally focused on the ways race, gender and other obvious interpersonal variables impair an observer's appreciation of persons as individuals. Stereotyped information is known to effect a number of past integration responses. Our results suggest that obvious interpersonal variables may serve to cognitively individuate as well as deindividuate group members for an observer, depending upon the structure of these variables within the group.

General Discussion

The five studies described above have employed informational manipulations involving both existing generic knowledge structures and theoretically constructed variations. We have found evidence that discriminability and nodal association factors strongly influence the use of persons as organizing categories during the initial classification of social information. An inter-feature association factor seemed less important during such initial classification processes, but it was found to be influential when subjects were given an opportunity to contemplate the internal consistency of person categories.

Some studies on the influence of the three components on the organization of free recall have found evidence for the organizational influence of the discriminability and inter-feature association factors, but not the nodal association factor (Pryor, Simpson, Ostrom, Dukerich & Jost, Note 2). One explanation for this discrepancy is that different factors may influence the use of person organization during different phases of information processing. As stated above the speeded classification methodology would appear to be especially sensitive to informational variations immediately perceivable to an observer; whereas, a free recall methodology as used in Pryor et al. (Note 2) allows subjects to contemplate the information in a more detailed fashion. Also, in a free recall paradigm the subject may utilize associations independent of the person-by-person categorical structure to help in recalling the information. Hence, under these circumstances inter-feature association emerges as a more important influence.

On the basis of the present studies and those reported in Pryor, et al. (Note 2), discriminability was a common factor in influencing the use of persons as organizing categories across the two diverse tasks of speeded classification and clustering in free recall. Considering that the influence of discriminability involves the basic process of detecting correlational structures, it follows that such a factor should be of great importance in the development and use of persons as organizing categories.

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Footnotes

[1]As an exploratory measure, subjects were asked to freely recall the descriptor information from the last sorting trial (this was either High or Low Discriminability). Recall was very low (an average of 3.7 out of a possible 16 descriptors). This was probably due to the fact that subjects did not expect to recall the information. Also fatigue and proactive inhibition may have been factors. Analyses of errors, total recall, and person clustering failed to show significant results.

[2]As an exploratory measure, this experiment's procedure also incorporated a surprise recall test for the last deck that had been sorted. As it turned out, subjects were able to recall very few of these (an average of 2.88 out of a possible 16). This is probably because the recall was unexpected, because of proactive inhibition, because the subjects may have been fatigued. No significant effects emerged in analyses of person clustering, errors, or total number recalled.

Four Stimulus Ensembles Used in the Manipulations of

Name Familiarity and Inter-item Association Value in Experiment 1

Association Value of the Descriptor Set	Names: Familiar	Names: Unfamiliar
High	Richard Nixon is shrewd	Timothy Clark is shrewd
	Richard Nixon is controversial	Timothy Clark is controversial
	Richard Nixon was a leader	Timothy Clark was a leader
	Albert Einstein was a genious	Joseph Williams was a genius
	Albert Einstein was a scientist	Joseph Williams was a scientist
	Albert Einstein was shy	Joseph Williams was shy
	Benjamin Franklin was an inventor	Humphrey Turnball was an inventor
	Benjamin Franklin was an author	Humphrey Turnball was an author
	Benjamin Franklin was a philosopher	Humphrey Turnball was a philosopher
Low	Richard Nixon is shrewd	Timothy Clark is shrewd
	Richard Nixon was a genius	Timothy Clark was a genius
	Richard Nixon was an inventor	Timothy Clark was an inventor
	Albert Einstein is controversial	Joseph Williams is controversial
	Albert Einstein was a scientist	Joseph Williams was a scientist
	Albert Einstein was an author	Joseph Williams was an author
	Benjamin Franklin was a leader	Humphrey Turnball was a leader
	Benjamin Franklin was shy	Humphrey Turnball was shy
	Benjaimin Franklin was a philosopher	Humphrey Turnball was a philosopher

Table 2

Matrix of Focal Characteristics Used in

Manipulating Discriminability in Experiment 4

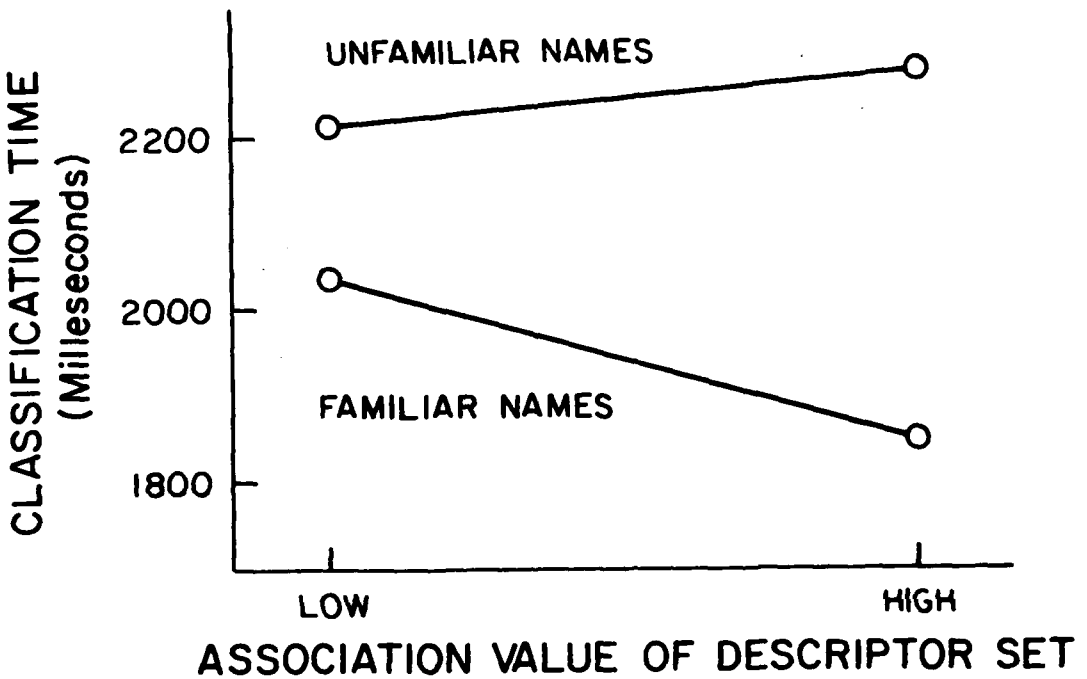
Rows Represent High Discriminability Groups

(Person 1) White Male Refined	(Person 2) Black Female Charitable	(Person 3) Black Male Thoughtful	(Person 4) White Female Amusing
(Person 5) White Male Sophisticated	(Person 6) Black Female Altruistic	(Person 7) Black Male Attentive	(Person 8) White Female Humorous
(Person 9) White Male Cultured	(Person 10) Black Female Generous	(Person 11) Black Male Helpful	(Person 12) White Female Witty
(Person 13) White Male Well-bred	(Person 14) Black Female Giving	(Person 15) Black Male Considerate	(Person 16) White Female Funny

Columns Represent Low Discriminability Groups

Figure Caption

Figure 1. Classification time as a function of Name Familiarity and the Association Value of the descriptor configurations in Experiment 1.


UNFAMILIAR NAMES
FAMILIAR NAMES
2200
2000
1800
CLASSIFICATION TIME
(Milleseconds)
LOW
HIGH
ASSOCIATION VALUE OF DESCRIPTOR SET

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